Trend Study 4-18-06

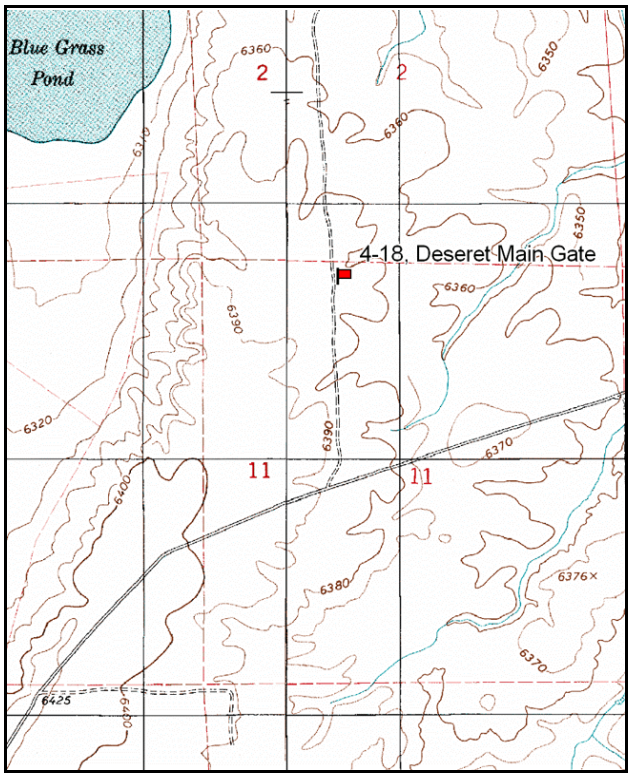
Study site name: Deseret Main Gate . Vegetation type: Big Sagebrush-Grass .

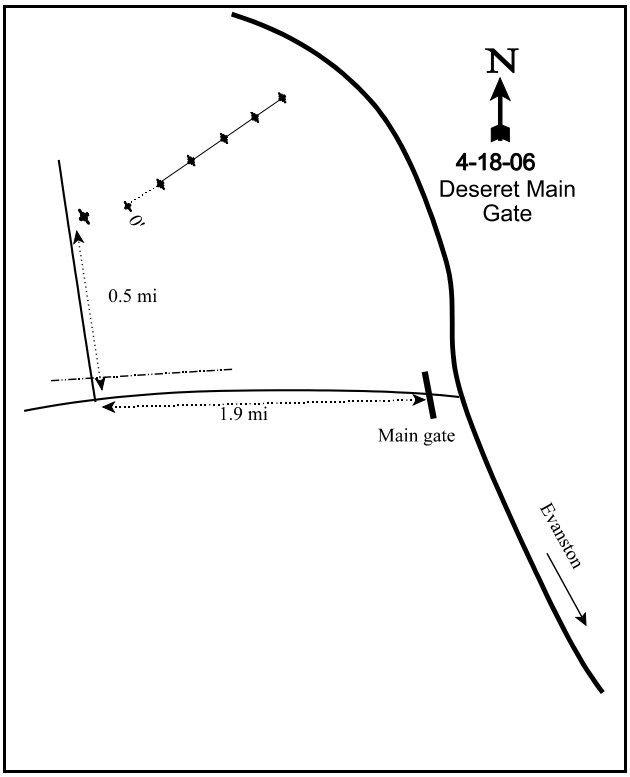
Compass bearing: frequency baseline 12 degrees magnetic.

Frequency belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).
Rebar on belt 2 at ~10ft.

LOCATION DESCRIPTION

From the Deseret Land & Livestock main gate on highway 16 between Evanston and Woodruff, proceed west towards the Deseret ranch house 1.9 miles. Turn right and go 0.5 miles north to a witness post on the east side of the road. The 0-foot stake is 9 paces at 48 degrees magnetic.




Map name: Neponset Reservoir NE Diagrammatic Sketch

Township 8N , Range 6E , Section 11 UTM NAD 27, UTM 12T 4588675 N 489762 E

## DISCUSSION

### Deseret Main Gate - Trend Study No. 4-18

#### Study Information

This study is located near the Deseret Land and Livestock ranch's east entrance, off of Highway 16 (elevation: 6,400 feet, slope: level, aspect: level). It was established in 1997 as part of a special study. This area is used by elk, mule deer, pronghorn, cattle, and sage grouse. The pellet group transect in 2001 estimated 19 elk days use/acre (48 edu/ha), 9 deer/pronghorn days use/acre (23/ha), and 53 cow days use/acre (131 cdu/ha). Two sage grouse pellet groups were also sampled. The 2006 pellet group transect data estimate was 62 elk, 11 deer/pronghorn, and 44 cow days use/acre (154 edu/ha, 28 d-adu/ha, and 109 cdu/ha). An estimated 52 sage grouse pellet groups/acre were also sampled. Elk pellets were from fall, winter, and spring. Pronghorn remains were identified near the exclosure.

#### Soil

The soil is in the Woodpass series, which consists of very deep, well drained soils that formed in alluvium derived mainly form sandstone and limestone and are found on alluvial fans and uplands (USDA-NRCS 2006). It is a loam texture and slightly acidic soil reaction (6.3 pH). The estimated effective rooting depth is over 14 inches. There is little rock or pavement on the soil surface or within the profile. Vegetation cover comes primarily from crested wheatgrass and Wyoming big sagebrush. Relative bare ground cover is fairly abundant (36% in 1996, 27% in 2001, and 30% in 2006), most of which is in the interspaces between crested wheatgrass and sagebrush. Erosion is minimal due to the gentle slope. Moderate pedestaling around sagebrush stems and crested wheatgrass clumps provide some evidence of past erosion. In 2001 and 2006, the erosion condition class assessments were stable.

#### Browse

The key browse species is Wyoming big sagebrush, which had an estimated density of 5,280 plants/acre in 1997, 5,780 plants/acre in 2001, and 3,900 plants/acre in 2006. Use on sagebrush was moderate to heavy in 1997, and light to moderate in 2001 and 2006. Decadence has increased from 27% of the population in 1997 to 43% in 2001, and to 45% in 2006. Plants classified as dying have increased from 10% of the population in 1997 to 11% in 2001, to 28% in 2006. Vigor was normal in the majority of the population in 1997 and 2001, but plants with poor vigor increased to 36% of the population in 2006. This increase in poor vigor in 2006 is likely due to an infestation of the sagebrush defoliator moth (*Aroga websterii*), which was identified on 10% of the sampled population. The study was sampled in August, after the web-like silk of the moth was gone and only defoliated plants remained. It can be assumed that many of the plants classified as dying were defoliated by the moth, but were not necessarily dying. Recruitment from young plants has been much lower than the percentage of plants classified as dying. Young plants made up 4% of the population in 1997, 8% in 2001, and 11% in 2006. This deficit in recruitment is playing a large role in the loss of sagebrush.

#### Herbaceous Understory

Crested wheatgrass is the dominant understory species, having contributed 12% cover in 1997, 18% in 2001, and 37% in 2006. Some utilization was noted on crested wheatgrass in 2001. Only two other grasses were sampled, Sandberg bluegrass and Indian ricegrass. Both species occur infrequently. Forbs are sparse and have provided less than 1% cover since 1997.

#### 2001 TREND ASSESSMENT

Trend for browse is stable. The Wyoming big sagebrush population increased in percent decadence, but use decreased to a more moderate level and the percentage of plants displaying poor vigor remains about the same. The density of plants classified as dying is currently higher than the density of young in the population. This factor should be monitored closely for a possible decline in density in the future. The grass trend is slightly up. The nested frequency of perennial grasses increased 14%, some of which is due to a significant increase in Sandberg bluegrass. The forb trend is stable. The nested frequency of perennial forbs remained unchanged.

The Desirable Components Index score in 1997 was good due to moderate browse cover and good perennial grass cover. The 2001 DCI score remained good.

1997 winter range condition (DC Index) - good (50) Lower potential scale
2001 winter range condition (DC Index) - good (54) Lower potential scale
browse - stable (0) grass - slightly up (+1) forb - stable (0)

2006 TREND ASSESSMENT

The browse trend is down. The density of Wyoming big sagebrush, the key browse species, declined 33%. The percentages of plants with poor vigor and plants classified as dying increased substantially. Most of the decline is the lack of recruitment to replace dying individuals, but the sagebrush defoliator moth is likely a cause of some of the increase in poor vigor. The grass trend is slightly up. The nested frequency of perennial grasses increased 15% and the nested frequency of Sandberg bluegrass increased significantly again. The forb trend is stable. The nested frequency of perennial forbs increased slightly since 1997, but the abundances remain low. Longleaf phlox, a species beneficial to sage grouse, increased significantly since 2001. Diversity is low, but has increased from 2 species in 1997 to 6 in 2006. The DCI score declined to fair to good due to decreased browse cover.

winter range condition (DC Index) - fair to good (47)Lower potential scale
browse - down (-2) grass - slightly up (+1) forb - stable (0)

HERBACEOUS TRENDS --
Management unit 04 , Study no: 18

| Type | Species | Nested Frequency | | | Average Cover % | | |
|---|---|---|---|---|---|---|---|
| | | '97 | '01 | '06 | '97 | '01 | '06 |
| G | Agropyron cristatum | $_{a}$373 | $_{ab}$403 | $_{b}$417 | 11.72 | 18.31 | 37.15 |
| G | Oryzopsis hymenoides | - | 3 | - | - | .03 | - |
| G | Poa secunda | $_{a}$6 | $_{b}$27 | $_{c}$83 | .03 | .26 | 1.28 |
| Total for Annual Grasses | | 0 | 0 | 0 | 0 | 0 | 0 |
| Total for Perennial Grasses | | 379 | 433 | 500 | 11.75 | 18.60 | 38.43 |
| Total for Grasses | | 379 | 433 | 500 | 11.75 | 18.60 | 38.43 |
| F | Alyssum alyssoides (a) | - | 5 | - | - | .03 | - |
| F | Antennaria rosea | - | - | 4 | - | - | .06 |
| F | Astragalus convallarius | - | 11 | 2 | - | .07 | .01 |
| F | Descurainia pinnata (a) | - | 1 | 1 | - | .00 | .00 |
| F | Phlox hoodii | $_{a}$10 | $_{ab}$22 | $_{b}$35 | .05 | .14 | .34 |
| F | Phlox longifolia | $_{b}$10 | $_{a}$- | $_{b}$19 | .10 | - | .10 |
| F | Trifolium sp. | - | 2 | 1 | - | .00 | .00 |
| Total for Annual Forbs | | 0 | 6 | 1 | 0 | 0.03 | 0.00 |
| Total for Perennial Forbs | | 20 | 35 | 61 | 0.15 | 0.22 | 0.52 |
| Total for Forbs | | 20 | 41 | 62 | 0.15 | 0.26 | 0.53 |

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 04 , Study no: 18

| Type | Species | Strip Frequency | | | Average Cover % | | |
|---|---|---|---|---|---|---|---|
| | | '97 | '01 | '06 | '97 | '01 | '06 |
| B | Artemisia tridentata wyomingensis | 90 | 95 | 82 | 11.57 | 11.61 | 5.93 |
| B | Atriplex gardneri falcata | 3 | 9 | 9 | .06 | .31 | .10 |
| B | Ceratoides lanata | 0 | 2 | 0 | - | - | - |
| B | Chrysothamnus viscidiflorus viscidiflorus | 60 | 46 | 26 | 1.27 | .57 | .30 |
| Total for Browse | | 153 | 152 | 117 | 12.91 | 12.50 | 6.33 |

CANOPY COVER, LINE INTERCEPT --
Management unit 04 , Study no: 18

| Species | Percent Cover |
|---|---|
| | '06 |
| Artemisia tridentata wyomingensis | 4.28 |
| Atriplex gardneri falcata | .20 |
| Chrysothamnus viscidiflorus viscidiflorus | .10 |

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 04 , Study no: 18

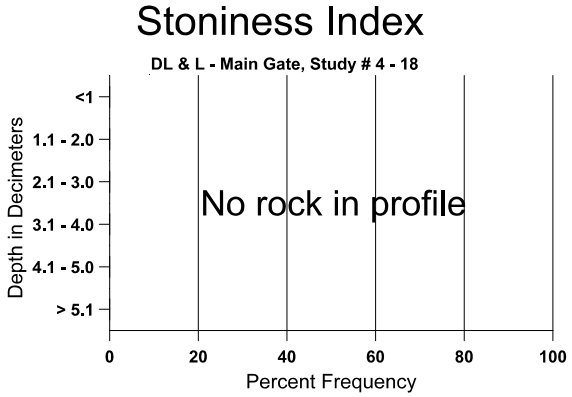
| Species | Average leader growth (in) | |
|---|---|---|
| | '01 | '06 |
| Artemisia tridentata wyomingensis | 0.9 | 1.3 |

BASIC COVER --
Management unit 04 , Study no: 18

| Cover Type | Average Cover % | | |
|---|---|---|---|
| | '97 | '01 | '06 |
| Vegetation | 21.86 | 28.14 | 47.08 |
| Rock | .64 | .08 | .38 |
| Pavement | 5.08 | 1.01 | .69 |
| Litter | 22.24 | 47.11 | 33.21 |
| Cryptogams | 9.64 | 10.44 | 3.49 |
| Bare Ground | 33.04 | 32.00 | 36.12 |

SOIL ANALYSIS DATA --
Herd Unit 04, Study no: 18, Deseret Main Gate

| Effective rooting depth (in) | Temp °F (depth) | PH | Loam | | | %0M | PPM P | PPM K | dS/m |
|---|---|---|---|---|---|---|---|---|---|
| | | | %sand | %silt | %clay | | | | |
| 14.6 | 69.6 (13.9) | 6.3 | 48.0 | 28.1 | 23.9 | 1.5 | 22.1 | 185.6 | 0.4 |




PELLET GROUP DATA --
Management unit 04 , Study no: 18

| Type | Quadrat Frequency | | | Days use per acre (ha) | |
|---|---|---|---|---|---|
| | '97 | '01 | '06 | '01 | '06 |
| Rabbit | 1 | 2 | 6 | - | - |
| Grouse | 1 | - | 1 | 17.4 groups/acre | 52 groups/acre |
| Elk | 24 | 5 | 57 | 19 (48) | 62 (154) |
| Deer | 22 | 8 | 1 | 9 (23) | 11 (28) |
| Cattle | 9 | 15 | 25 | 53 (131) | 44 (109) |
| Antelope | - | - | 1 | - | - |

BROWSE CHARACTERISTICS --
Management unit 04 , Study no: 18

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| Artemisia tridentata wyomingensis | | | | | | | | | | | | |
| 97 | **5280** | 40 | 220 | 3660 | 1400 | 980 | 48 | 42 | 27 | 10 | 10 | 14/22 |
| 01 | **5780** | 60 | 480 | 2840 | 2460 | 1140 | 29 | 10 | 43 | 11 | 11 | 12/20 |
| 06 | **3900** | 80 | 400 | 1760 | 1740 | 1080 | 42 | 11 | 45 | 28 | 36 | 13/21 |

| | | Age class distribution (plants per acre) | | | | | Utilization | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Plants per Acre (excluding seedlings) | Seedling | Young | Mature | Decadent | Dead | % moderate | % heavy | % decadent | % dying | % poor vigor | Average Height Crown (in) |
| Atriplex gardneri falcata | | | | | | | | | | | | |
| 97 | **260** | - | 40 | 220 | - | - | 0 | 0 | - | - | 0 | 4/5 |
| 01 | **980** | - | 320 | 660 | - | - | 0 | 0 | - | - | 0 | 3/4 |
| 06 | **880** | - | 280 | 600 | - | - | 30 | 11 | - | - | 0 | 5/9 |
| Ceratoides lanata | | | | | | | | | | | | |
| 97 | **0** | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 01 | **40** | - | - | 40 | - | - | 0 | 0 | - | - | 0 | -/- |
| 06 | **0** | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| Chrysothamnus viscidiflorus viscidiflorus | | | | | | | | | | | | |
| 97 | **2720** | - | - | 2720 | - | - | 0 | 0 | 0 | - | 0 | 6/8 |
| 01 | **1820** | - | 180 | 1400 | 240 | - | 0 | 0 | 13 | - | 0 | 4/6 |
| 06 | **620** | - | 220 | 320 | 80 | 40 | 13 | 16 | 13 | 3 | 13 | 5/7 |
| Opuntia sp. | | | | | | | | | | | | |
| 97 | **0** | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 01 | **0** | - | - | - | - | - | 0 | 0 | - | - | 0 | -/- |
| 06 | **0** | - | - | - | - | - | 0 | 0 | - | - | 0 | 3/5 |